Amendments to the Specification

Please amend the specification as indicated.

Please amend paragraph [0002] as follows:

This application is related to U.S. Patent Application No. ~~(to be determined)~~ 10/806,094, filed ~~(to be determined)~~ March 23, 2004, entitled "Method and System for Efficient and Accurate Processing of a Discrete Time Input Signal," attorney docket number 1857.0330002, having the same inventor, which is hereby incorporated herein by reference in its entirety.

Please amend paragraph [0066] as follows:

Profile executor 104 has the flexibility of generating acceleration output signal 120 and position output signal 118, either in phase or out of phase, as desired for better performance. The total phase delay of each path can be adjusted using time delays, which are incurred by time delay components 322 and 346. These phase delays are quantitatively expressed below in Equations (2-1) and (2-2). Equation (2-1) represents the phase delay for acceleration signal path 312. Equation (2-2) represents the phase delay for position signal path 314.

$$\Phi_A \cancel{= (((TFIRAS-1)/2) + TDA)FT \qquad (2\text{-}1)}$$

$$\Phi_P \cancel{= (((TFIRPS-1)/2) + 1)ST + (((T_{eq} + 1)/2) + TDP)FT \qquad (2\text{-}2)}$$

$$\underline{\phi_A = \left(\frac{TFIRAS-1}{2} + TDA\right)FT} \qquad \underline{(2\text{-}1)}$$

$$\underline{\phi_P = \left(\frac{TFIRPS-1}{2} + 1\right)ST + \left(\frac{T_{eq}+1}{2} + TDP\right)FT} \qquad \underline{(2\text{-}2)}$$

Please amend paragraph [0079] as follows:

Due to the convolution property of the Fourier transform, Y(ω) can be written as:

$$Y(\omega) = H(\omega)\, X(\omega) \qquad (3\text{-}1)$$

This relationship can also be expressed as

$$\cancel{Y(\omega) = |H(\omega)|\,|X(\omega)|\, e^{-j(\Phi[H(\omega)] + \Phi[X(\omega)])} \qquad (3\text{-}2)}$$

$$\underline{Y(\omega) = |H(\omega)|\,|X(\omega)|\, e^{-j(\phi[H(\omega)]+\phi[X(\omega)])} \qquad (3\text{-}2)}$$

In Equation (3-2), ~~Φ represents~~ $\underline{\phi}$ <u>represents</u> signal phase.

Please amend paragraph [0080] as follows:

The phase of any of the interpolation filtering approaches is expressed below in Equation (3-3).

$$\cancel{\Phi[H(\omega)] = \Phi_L[H(\omega)] + \Phi_{NL}[H(\omega)] = \beta(\omega) + \Phi_{NL}[H(\omega)] \qquad (3\text{-}3)}$$

$$\underline{\phi[H(\omega)] = \tilde{\phi}[H(\omega)] + \hat{\phi}[H(\omega)] = \beta\omega + \hat{\phi}[H(\omega)] \qquad (3\text{-}3)}$$

Please amend paragraph [0081] as follows:

In Equation (3-3), ~~Φ_L represents~~ $\tilde{\phi}$ represents a linear phase component and ~~Φ_{NL} represents~~ $\hat{\phi}$ represents a nonlinear phase component. For the Lagrange filtering approach described above, this nonlinear component is zero. Thus, for the Lagrange approach, Y(ω) can be written as shown below in Equation (3-4).

$$\cancel{Y(\omega) = |H(\omega)|\,|X(\omega)|\,e^{-j(\beta(\omega)+\Phi[X(\omega)])}e^{-j\Phi_{NL}[H(\omega)]}} \quad \cancel{(3\text{-}4)}$$

$$Y(\omega) = |H(\omega)|\,|X(\omega)|\,e^{-j(\beta\omega+\phi[X(\omega)])}e^{-j\hat{\phi}[H(\omega)]} \quad (3\text{-}4)$$

Please amend paragraph [0082] as follows:

From Equation (3-4) the inverse Fourier transform of Y(ω), y(k), follows in Equation (3-5).

$$\cancel{y(k) = \tilde{y}(k-\Phi_{NL}[H(\omega)])} \quad \cancel{(3\text{-}5)}$$

$$y(k) = \tilde{y}(k-\hat{\phi}[H(\omega)]) \quad (3\text{-}5)$$

Please amend paragraph [0083] as follows:

In Equation (3-5), ỹ(k) represents an ideal output. If ~~$\Phi_{NL}[H(\omega)]$~~ $\hat{\phi}$ [H(ω)] equals zero, then the outputs of interpolation components 320 and 344 are identical to theoretical outputs.

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Please amend paragraph [0114] as follows:

The description now turns to an example of interpolation filter optimization using a 3 taps (N=3) FIR filtering process and an interpolation factor of 2 (R=2). Equation (9-1) is an expression of an output sequence generated by this example interpolation process.

$$y(t) = b_0\, u(t) + b_1 u(t-T_f) + b_2 u(t-2T_f) \qquad (9\text{-}1)$$

In Equation (9-1), $u(t)$ represents the input to the interpolation filtering process, $y(t)$ represents the process output. The coefficients ~~b_0, b_2, and b_3~~ $\underline{b_0,\ b_1,\text{ and } b_2}$ represent the FIR filtering coefficients.

Please amend paragraph [0115] as follows:

By letting $u(t - kT_f) = u(mT_s)$ (where $k = 0, 1$; and where $m = 1, 2, 3 \ldots$), features of input sequence, $u(k)$, are shown <u>in</u> Equations (9-2) and (9-3).

$$u(t - (k+1)T_f) = 0 \qquad (9\text{-}2)$$

$$u(t - (k+2)T_f) = u((m-1)T_s) \qquad (9\text{-}3)$$

$$\cancel{\text{if } k = 0 \rightarrow u(t) = u(mT_s) \rightarrow u(t\ T_f) = 0 \rightarrow u(t\ 2T_f) = u(mT_s\ T_s) \rightarrow y(t) = b_0 u(mTs) + b_2 u(mT_s\ T_s)}$$

$$\underline{\text{if } k = 0 \rightarrow u(t) = u(mT_s) \rightarrow u(t-T_f) = 0 \rightarrow u(t-2T_f) = u(mT_s-T_s) \rightarrow y(t) = b_0 u(mT_s) + b_2 u(mT_s-T_s)}$$

$$\text{if } k = 1 \rightarrow u(t) = 0 \rightarrow u(t-T_f) = u(mT_s) \rightarrow u(t-2T_f) = 0 \rightarrow y(t) = b_1 u(mT_s)$$

Thus, the maximum number of operations required for this example is expressed in Equation (9-4).

$$2ceil[(N+1) / R] - 1 = 2ceil[(3+1) / 2] - 1 = 3 \qquad (9\text{-}4)$$

As shown in Equation (9-4), only 3 operations are required to perform this example interpolation filtering function.